Historic, archived document

Do not assume content reflects current scientific knowledge, policies, or practices.

Station Paper No. 77

May 1957

New Spray Puller for Turpentining

. . . and how to use it

by Ralph W. Clements

LIBRARY
SEP 30 1957
U.S. DEPARTMENT OF AGRICULTURE

SOUTHEASTERN FOREST EXPERIMENT STATION
Asheville, North Carolina

Joseph. F. Pechanec,
Director

U. S. Department of Agriculture - Forest Service

NEW SPRAY PULLER FOR TURPENTINING

And How to Use it

by

Ralph W. Clements
Lake City Research Center

INTRODUCTION

For the first time since the development of bark chipping, a highly satisfactory tool for bark pulling and acid treatment of high faces is now available for gum naval stores production. Although a spray-puller has been on the market for several years,[1] it has never performed satisfactorily because of weaknesses in the design. This tool has been redesigned and all of the known objectionable features have been eliminated.

DESCRIPTION OF THE BARK-PULLER

The basic parts of the spray-puller are the pulling blade, the aluminum tubing stock, and the plastic spray mechanism.

The new bark-pulling blade.--The improved puller blade has been designed and developed to remove all of the bark, cut a clean streak, and in general to make bark pulling easy. The new blade and its critical dimensions are shown in figure 1.

In designing the new blade, a major change was made in the width of the bill. At the cutting edge, the bill is now 1/8 inch wider than the throat at the rear of the blade. This gives a flare to the blade at the cutting edge. As a result, the cutting edges actually "lead" into the bark. No pressure is required to hold the edges against the exposed wood, and the stock riding against the tree will not force the edges away from the streak and the line of cut. If the cutting edges bite too deeply into the wood, the lower, bottle end need only be swung away from the tree. The same principle is used to regulate the streak depth in either wood or bark chipping.

The 3/4-inch jaw determines the height of each streak pulled. The blade and its angle of attachment to the clamp have been designed for the jaw to run along the exposed wood and to cut a clean streak. The blade has not been designed for the wide part of the bill to run along the wood of the tree. Correct position of the blade for pulling a streak is shown in figure 2.

---

[1] Ryberg, M. E., and Burney, H. W. An Acid-Spraying Puller for Naval Stores Production. Jour. of Fla. Eng. Soc. 5(3): 15-27. 1951.

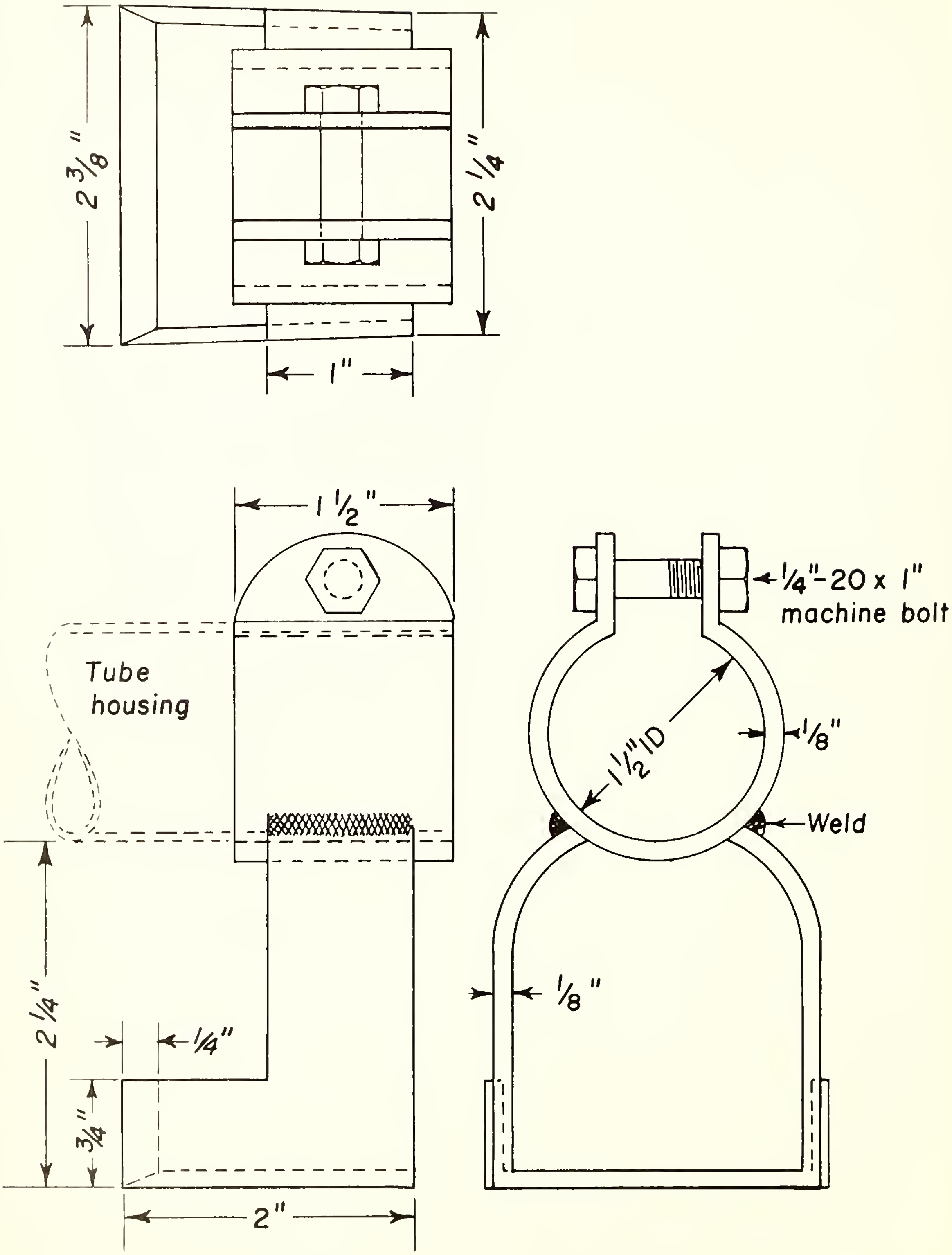


Figure 1.--Improved puller blade with ring clamp for mounting on Evans spray puller.

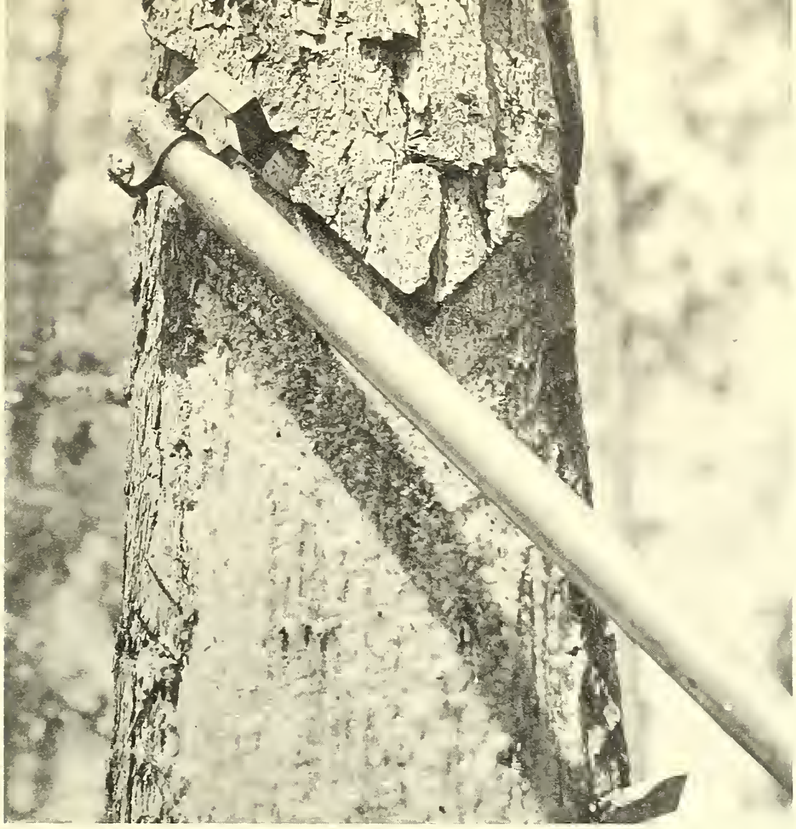


Figure 2.--Correct position for using the improved puller blade. The 3/4-inch jaw rides against the wood of the tree.

Spray mechanism.--The plastic parts which make up the sprayer mechanism of the spray-puller are shown in figure 3. Each piece is identified by a descriptive name which has been accepted as standard.

The baffle has been redesigned and greatly improved. It fits in the nozzle and serves two important purposes; (1) it permits filling the trap with acid when the tool is inverted, and (2) it retards the sloshing of acid from the nozzle when the streak is pulled. The baffle is an essential part of the sprayer mechanism and it never should be discarded as unimportant.

The compression sleeve of the acid trap has been substantially reinforced to prevent splitting, to hold the connector tube in place, and to prevent leakage inside the aluminum stock.

Drawings and specifications for all molded, plastic parts can be found in the appendix.

New pullers available in three lengths.--Spray pullers are now available in three lengths--36, 48, and 60 inches. The economical 36-inch length was designed primarily for the producer who must turn to pulling to finish working out the fourth year on timber leased for 4 years. When the producer turns from chipping to pulling, and he plans to work his timber for the fifth year, it is recommended that he purchase the 48-inch length. If he knows the pulling work will continue into the sixth year, it is recommended that he purchase the 60-inch offset model.

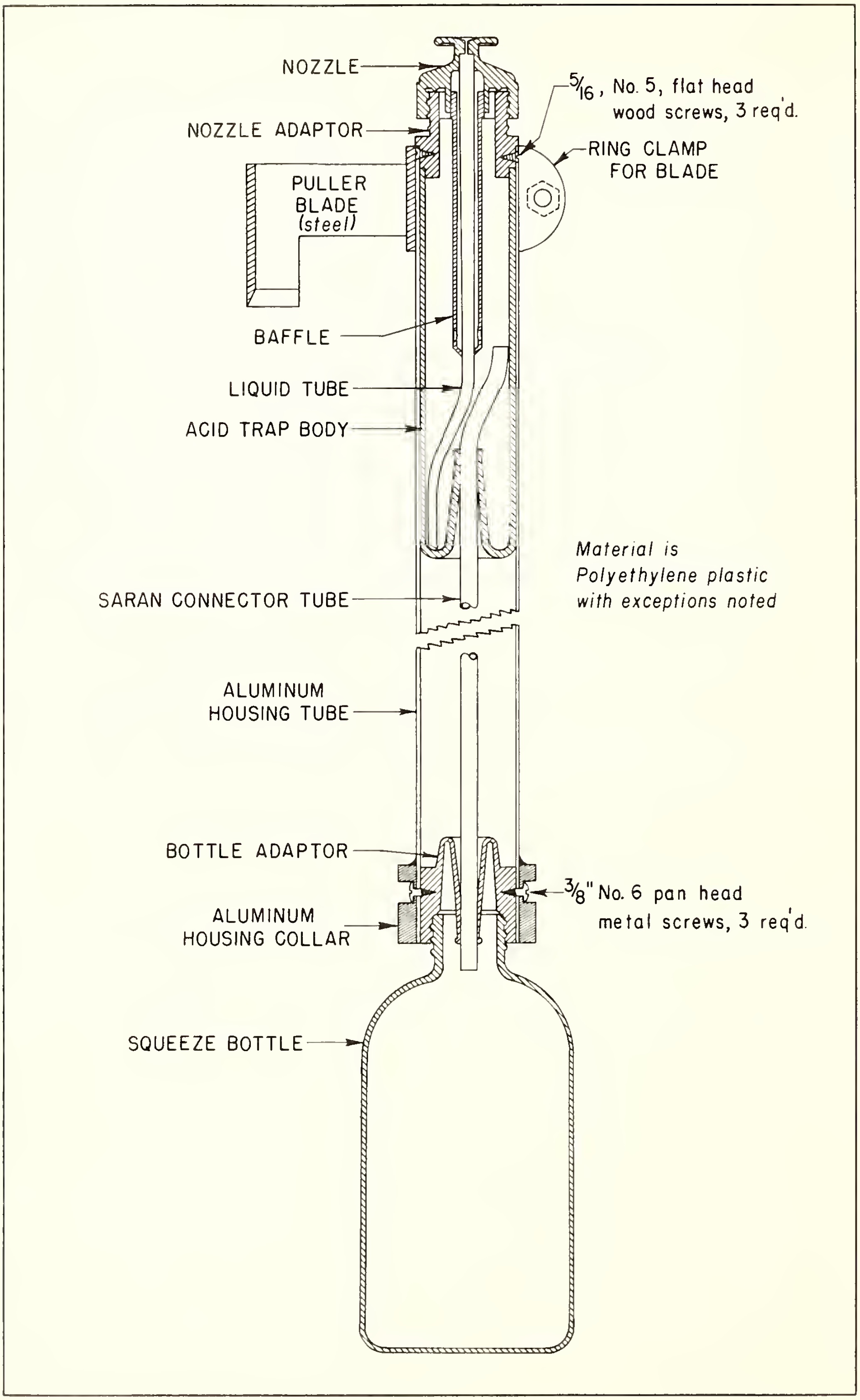


Figure 3.--Cutaway view of spray puller, showing assembly of plastic parts.

The three spray-pullers, each with a description for ordering, are shown in figure 4. All lengths work satisfactorily on low pulling faces like those encountered in the second half of the fourth year of work. Higher faces require the longer lengths. After the number of years of work has been specified by a naval stores producer, the puller can be selected which fits the proposed plan of work.

Cost of the pullers varies with the length of the stock. The cost of all new models has been reduced well below that of the previous model.

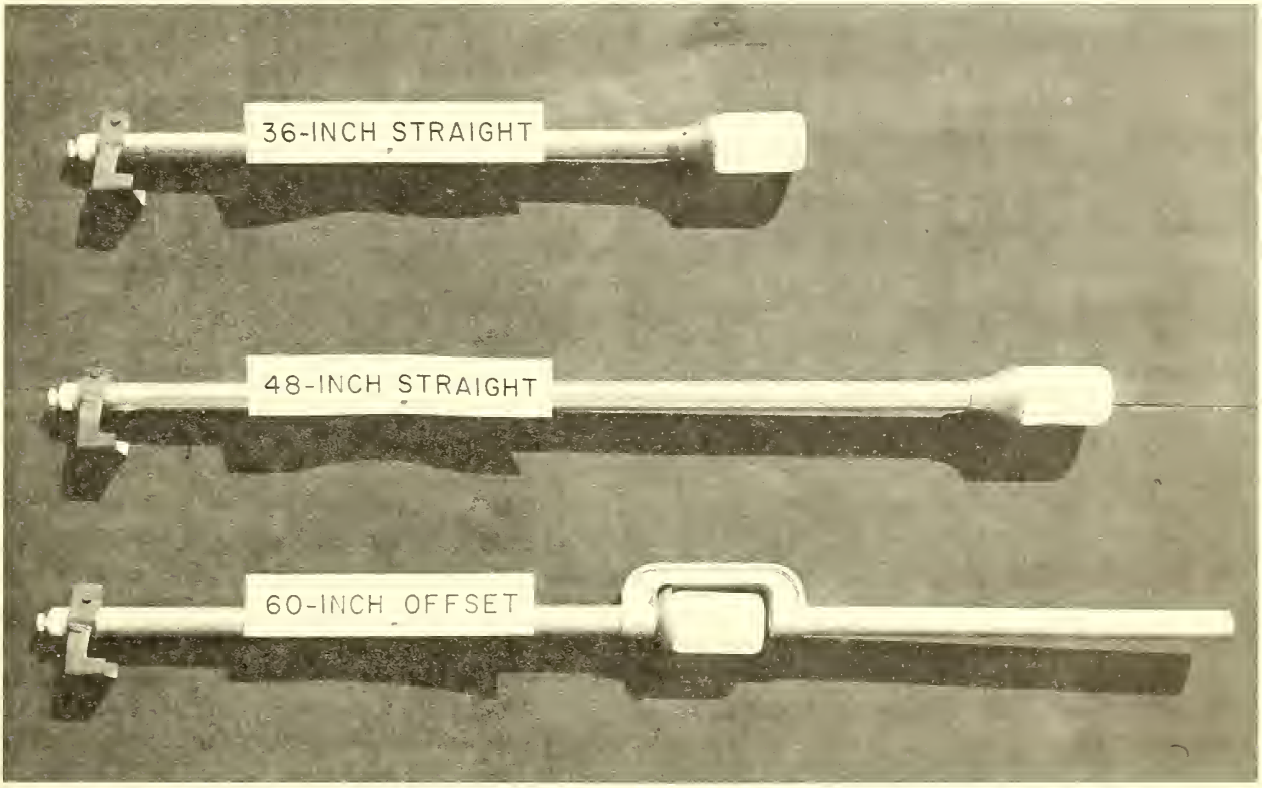


Figure 4.--Commercial spray-pullers now available in three lengths.

MAINTENANCE AND CARE OF THE SPRAY-PULLER

The nozzle, baffle, and liquid tube should be removed occasionally from the acid trap for cleaning. Do not try to cut away hardened gum from around the nozzle-opening with a knife. First, soften the gum with kerosene, then carefully scrape away the gum. Do not enlarge the nozzle opening with wire or any metal object. Remove gum from the nozzle opening with a toothpick or a sharpened, wooden match stem.

Before replacing the nozzle assembly, remove the bottle and flush the acid trap thoroughly with clean water to remove particles of trash caught in the trap. Bits of bark, pine straw, or other solid material will clog the air gates of the nozzle and the sprayer will not work. Drain all water from the trap before replacing the nozzle assembly or the bottle.

After cleaning, the liquid tube should be inserted first in the nozzle for reassembly, then the baffle is slipped over the liquid tube and pushed firmly in place. In attaching the nozzle assembly to the acid trap, the liquid tube should be located on the side of the trap opposite the connector tube. See figure 3 for a cutaway view of the acid trap revealing the position of both liquid and connector tubes.

Do not attempt to remove or adjust the connector tube. The distance this tube extends into the trap governs the amount of acid caught in the trap. All acid in the trap above the tube will flow back into the bottle. The tube is permanently placed by the manufacturer at the time of assembly.

The acid trap is held in place by three special, metal screws. These screws are located at the top of the aluminum-tubing stock. When the puller blade is attached, the ring clamp slips over these screws and hides them from view. These screws should never be removed, and care should be taken to prevent acid from reaching them. If screw heads are eaten away by acid, the trap will turn when an attempt is made to tighten the nozzle.

The bottle adaptor is held in place by pan-head screws. These screws prevent the adaptor from turning when the bottle is tightened for a leak-proof fit, and should not be removed. They are located at the lower end of the stock, and acid should never reach them.

Since both acid trap and bottle adaptor are permanently anchored inside the stock, these two parts should not be removed for cleaning. If leakage occurs inside the stock, return the entire-spray puller to the manufacturer for repairs.

The puller blade, ring clamp, and clamp bolt are metal, and will corrode if they are left exposed to sulfuric acid. Before placing a new puller blade in use, it is recommended that the blade, the clamp, and the bolt be coated with gum taken directly from the turpentine cup. This coating of gum will lessen the corrosive action of the acid on the new and clean metal parts.

HOW TO USE THE SPRAY-PULLER

The bark-pulling method requires more skill, patience, and time than bark chipping and treating. Bark pulling must remove both outer and inner barks, and each streak must remove the acid-killed tissues. Then the right amount of acid must be correctly placed if the bark-pulling method is to prove effective.

Height of pulling streaks.--On most fifth- and sixth-year pulling faces for both slash and longleaf pine, a streak 3/4 inch high will give good yields when pulled and treated every 14 days. But good acid treatment is necessary, and penetration of the acid above the streak should range from 1/2 to 3/4 inch.

Peaked faces best.--In bark pulling and acid treatment, peaked faces will save the laborer much time at each tree and increase the number of faces he works each day. Slanted streaks require too much footwork in moving around the tree and are more difficult to treat.

Acid treatment of pulling streaks.--Sulfuric acid treatment has the same effect on streaks of pulling height as it does on streaks of chipping height. A bark streak at pulling height, if correctly treated with 50-percent sulfuric acid, will produce as much gum as two untreated, wood-pulled streaks. It is the acid that prolongs the flow of gum and gives good yields; therefore careful application is required on the pulling streaks. Poor gum yields from the bark-pulling method usually can be traced directly to poor and spotty acid treatment of the streaks.

Good treatment is more difficult to obtain on pulling faces than on faces of chipping height. It requires a little better aim and a little slower movement of the nozzle down the streak than with the hand-sprayer. The puller stock must be carefully handled so that the acid is sprayed along the juncture of wood and bark. In treating a high pulling streak, always start at the shoulder and move downward to the peak. Never start at the peak and move upward. It is much easier to steady and guide the puller nozzle as it moves down the peak. Movement of the nozzle down the streak should be slow enough to thoroughly wet the under-side of the bark and the exposed wood.

Hazards eliminated.--It is dangerous to try to treat high pulling streaks with the hand squeeze sprayer, and the treatment is seldom very effective. To reach the fresh streak, the laborer has to stand close to the tree, directly under the streak, and the acid spray blows or drifts down on his head or his clothes. The laborer is under physical strain trying to reach the high streak. He hurries his pass at the streak with the sprayer to get away before the acid drifts on his clothes, and poor coverage of the streak usually results.

With the specially designed spray-puller, laborers are able to back away a safe distance from the tree for treatment (fig. 5). Even on windy days when blow-back is the greatest, this tool reduces the hazards of treating streaks on high faces.

Operation of spray mechanism.--Fill the plastic bottle only two-thirds full of acid. Air space must be left at the top of the bottle. Do not strip the threads in the bottle adaptor by excessive tightening of the bottle. Only a moderately tight twist of the bottle is required to give a leak-proof fit.

It is impossible, by hand-squeeze, to force acid the length of the stock from bottle to nozzle. To provide adequate and easy discharge of acid by hand-squeeze, an acid trap is located at the upper end of the stock. This trap acts as a reservoir and stores about 35 cc. of acid. When the plastic bottle is squeezed, acid is forced from the trap up the liquid tube and out the nozzle.

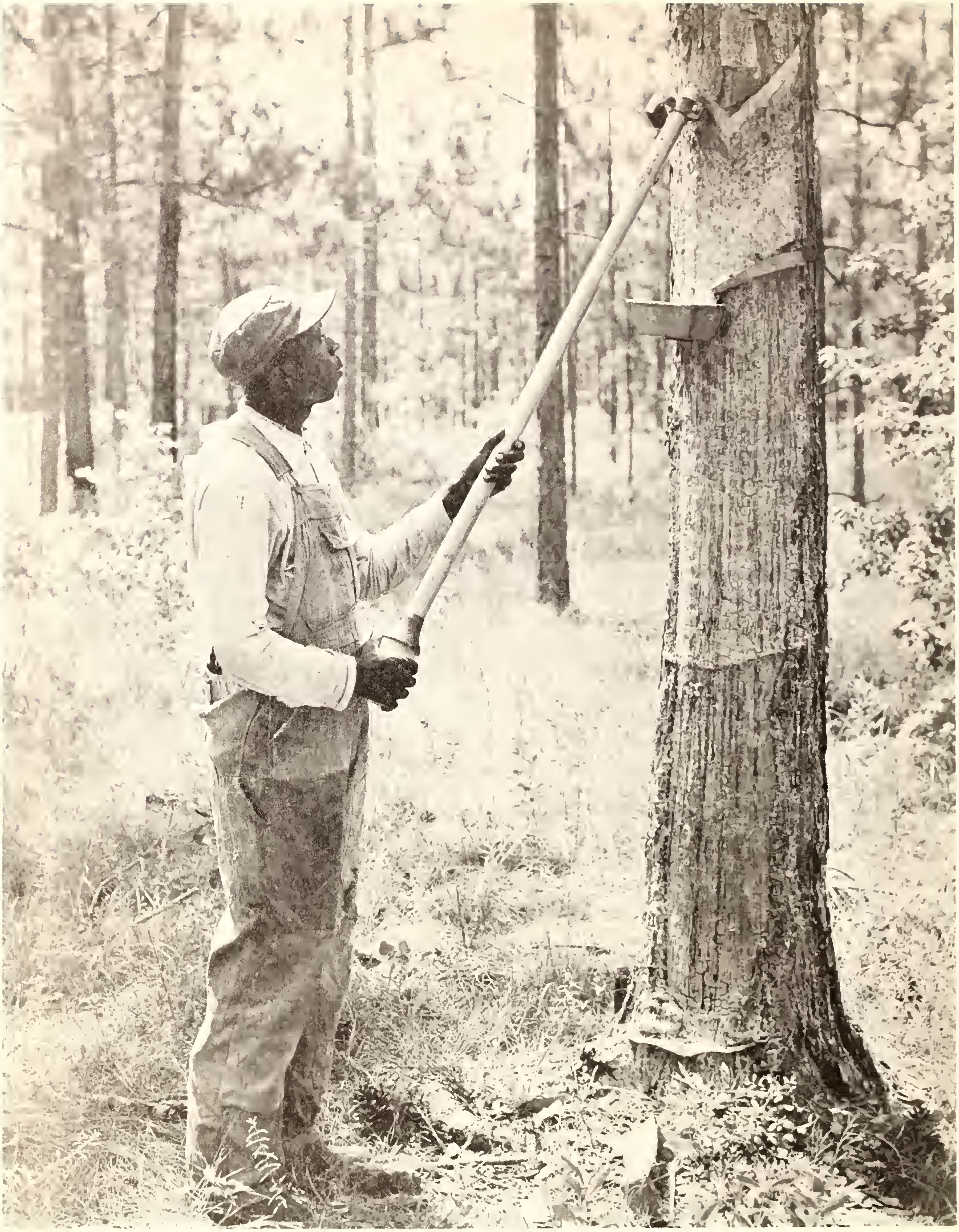


Figure 5.--Laborer shown treating bark-pulled streak with 48-inch spray-puller. Tree is in its fifth year of work and streak is 8 feet from ground, yet laborer stands safe distance from tree for treatment.

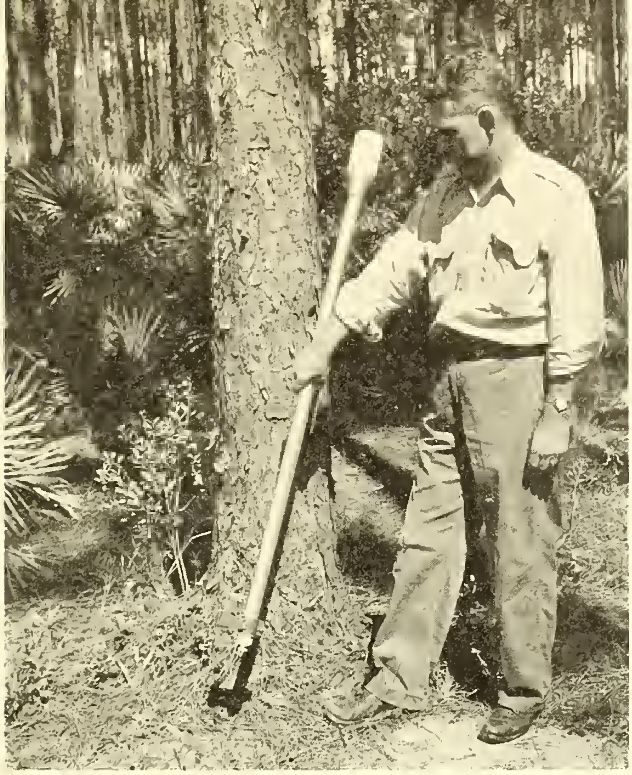


Figure 6.--Correct position for holding spray-puller to fill trap with acid.

The trap is filled by inverting the tool and pointing the nozzle at the ground (fig. 6). Air space must be present in the top of the trap, so the connector tube is permanently set and the trap will never fill over half full. Continuous acid drip at the nozzle will indicate the trap is filled to its capacity. However, the trap will not retain the acid unless the baffle is securely in place in the nozzle. The baffle must form a leak-proof fit, or acid will leak out the nozzle opening. While in use in the woods, the trap should be refilled after treating about 10 to 15 trees. Then the supply of acid in the trap will be kept at the proper operating level. The refilling can be done while the laborer walks from tree to tree.

If acid is not discharged from the nozzle when the bottle is squeezed, make the following checks:

1. Be sure there is a supply of acid in the trap. When the trap is properly filled (half full), less pressure is required on the bottle for a quick discharge of acid with a good delivery rate. The flow of acid from bottle to trap may be hastened by a slight squeeze on the bottle while the nozzle is tilted downward.

2. Be sure liquid tube is firmly in place in the nozzle.

3. Check nozzle and bottle threads for possible air leaks. Tighten each sufficiently to stop air leaks.

4. Be sure that nozzle is clean and that no trash is in the trap.

5. Do not trim liquid or connector tubes in an attempt to improve the spray characteristics. The source of the trouble is not in these tubes.

The sprayer mechanism should be tested with water and these operating hints demonstrated to each laborer before assigning the tool for woods use.

The improved spray-puller is designed to give years of trouble-free service. Each tool is tested and guaranteed when it leaves the manufacturer's assembly line. The plastic parts should never wear out, but they can be damaged by abuse in the woods and improper care. Most spray-puller failures can be traced directly to abuse in the woods and tampering with the sprayer mechanism by unqualified persons.

POINTS TO REMEMBER

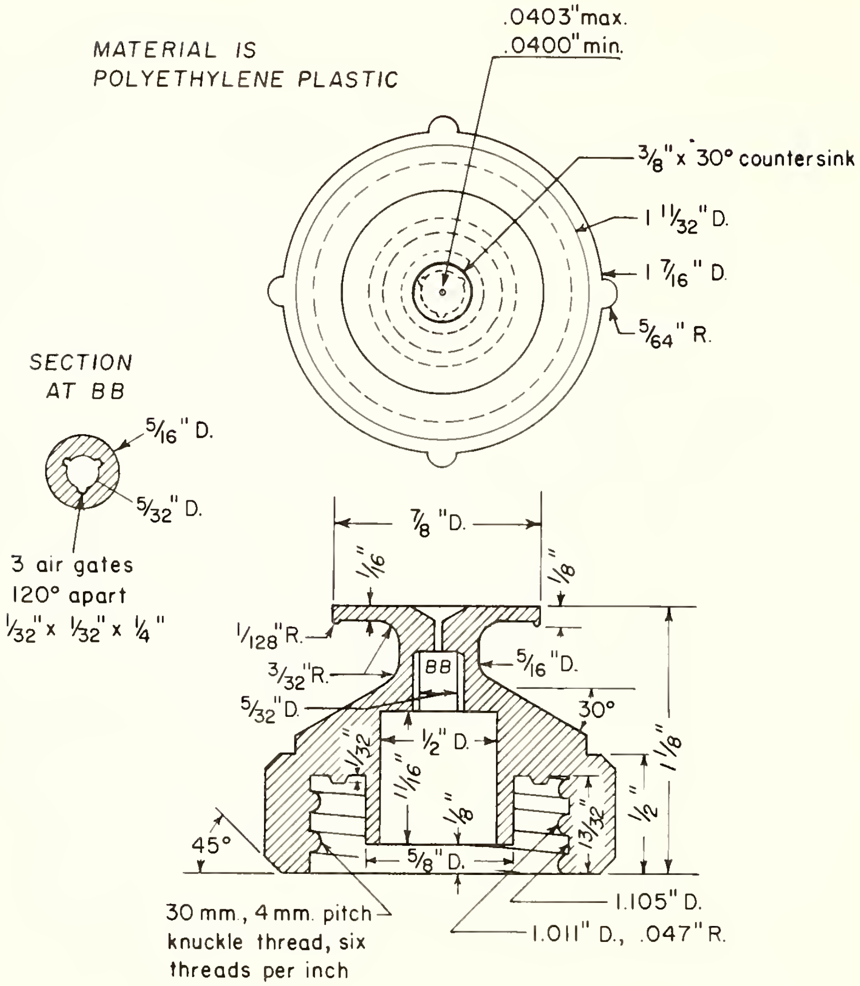
1. Fill bottle two-thirds full
2. Don't strip threads on bottle
3. Check liquid tube for tight connection
4. Check nozzle and bottle threads for air leaks
5. Fill acid trap by tilting nozzle toward ground
6. Keep nozzle and trap clean
7. Do not attempt repairs in woods

APPENDIX

Detailed working drawings for construction of the molded polyethylene parts for the spraying mechanism.

SPRAY-PULLER NOZZLE

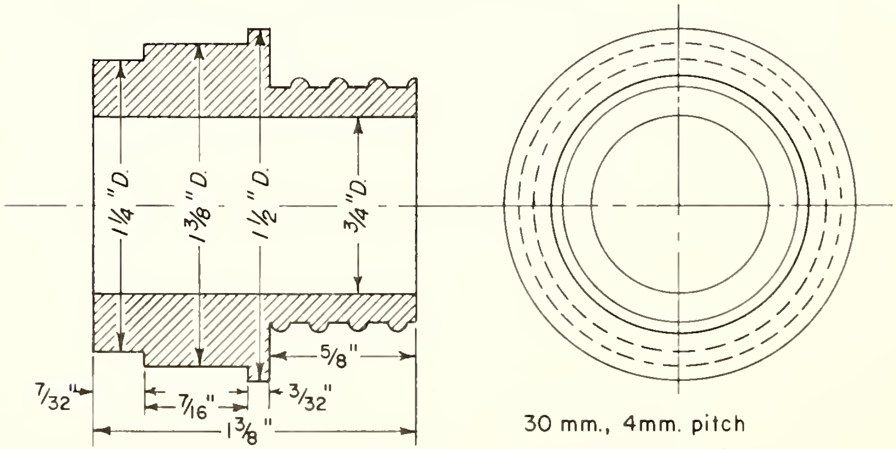
MATERIAL IS
POLYETHYLENE PLASTIC



30 mm., 4 mm. pitch knuckle thread, six threads per inch

NOZZLE ADAPTOR

POLYETHYLENE PLASTIC

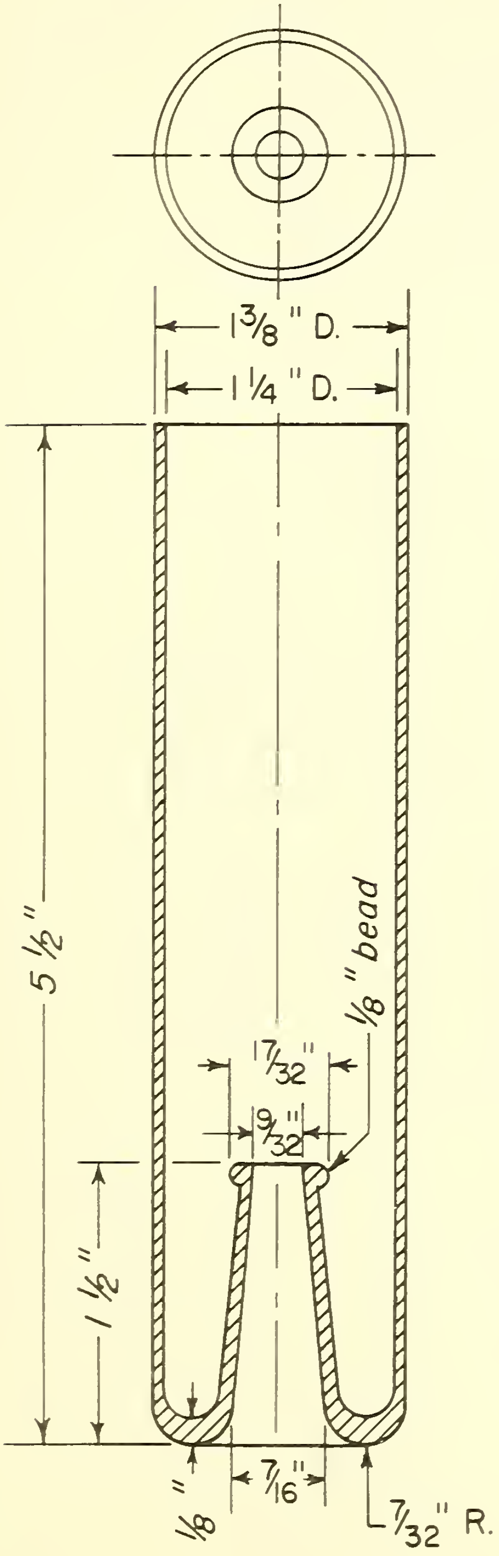


Nozzle adaptor is plastic welded to acid trap body

30 mm., 4mm. pitch knuckle thread, six threads per inch

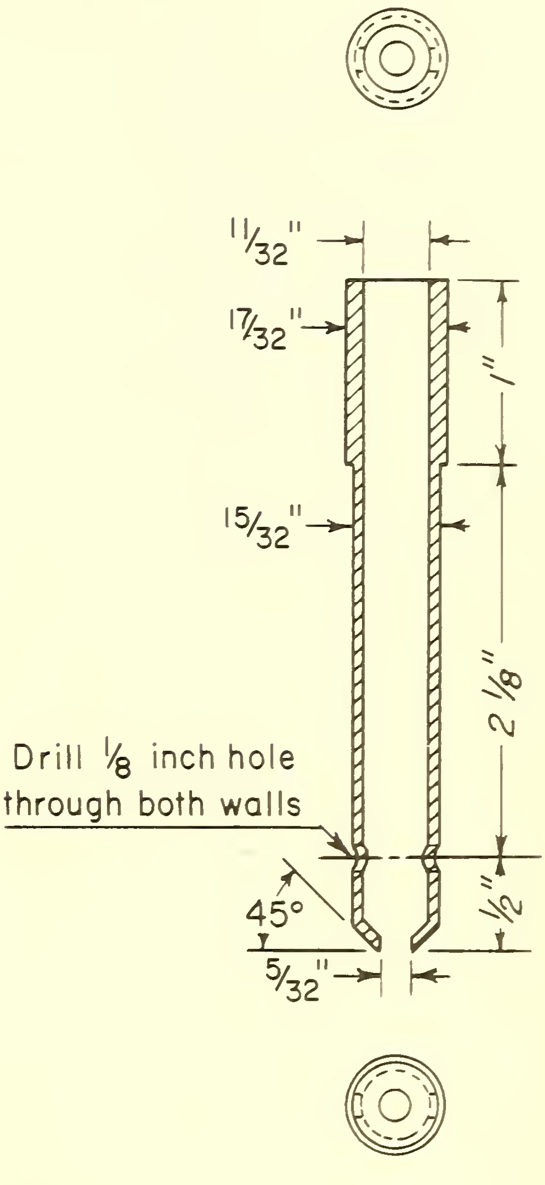
ACID TRAP BODY

POLYETHYLENE PLASTIC



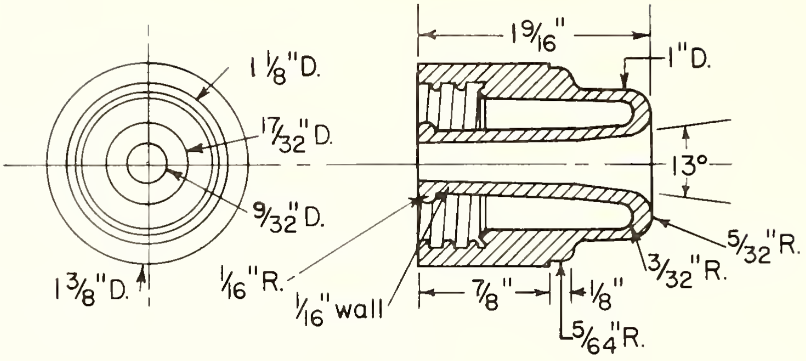
BAFFLE

POLYETHYLENE PLASTIC



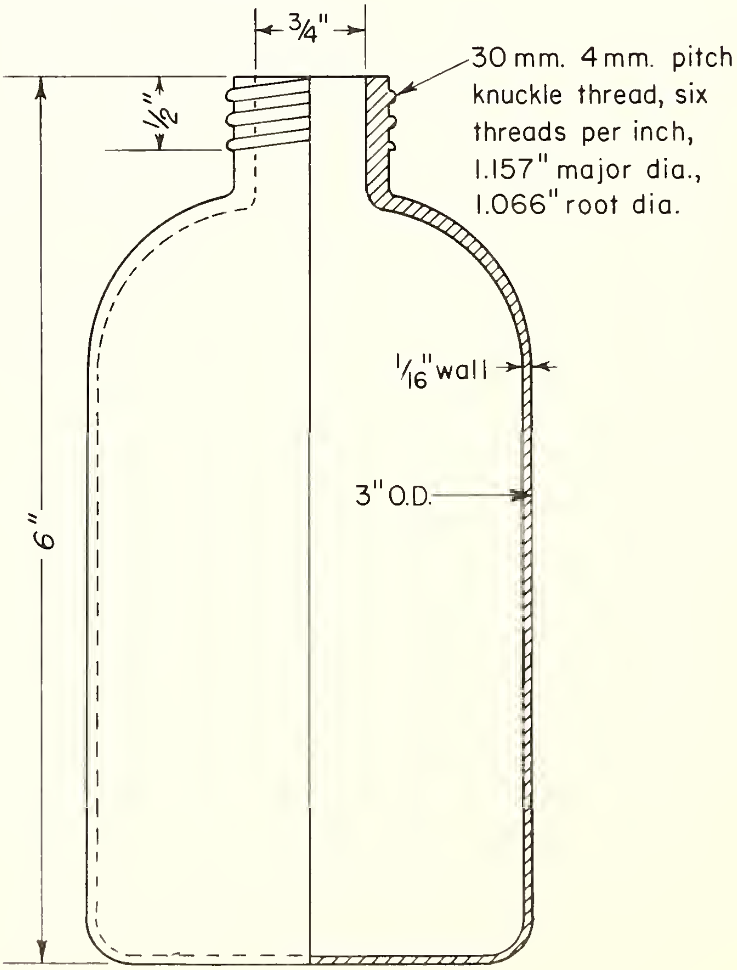
BOTTLE ADAPTOR

POLYETHYLENE PLASTIC



SQUEEZE BOTTLE

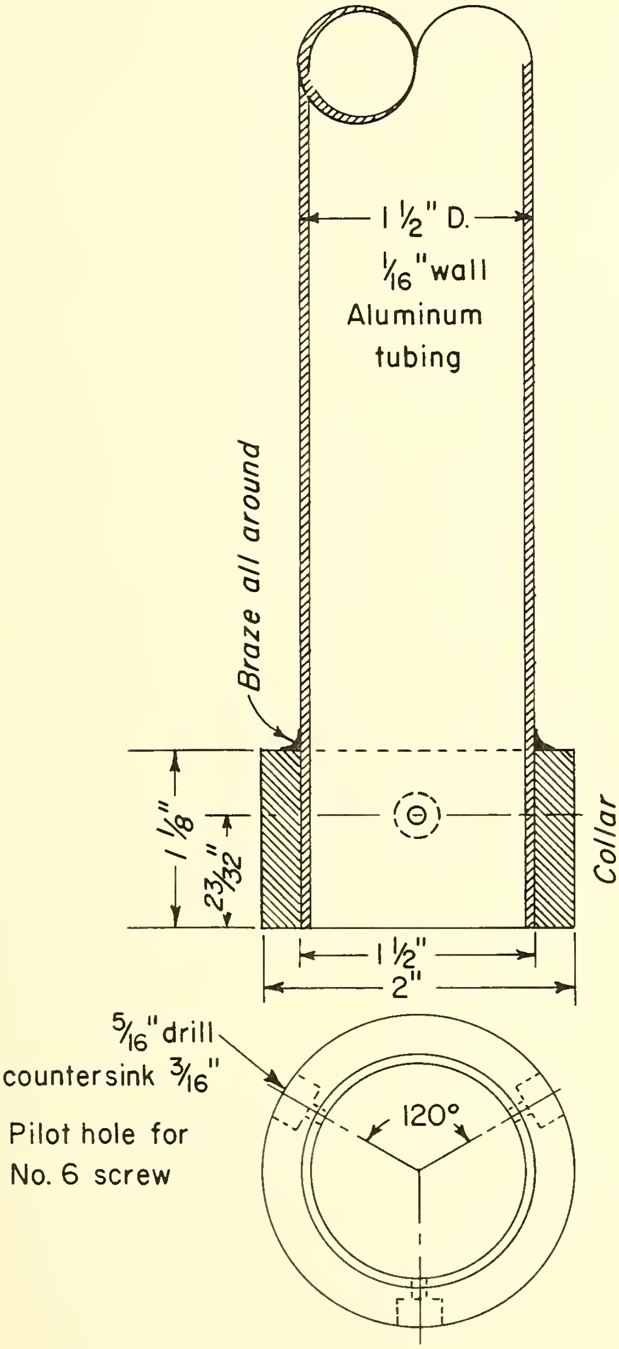
POLYETHYLENE PLASTIC



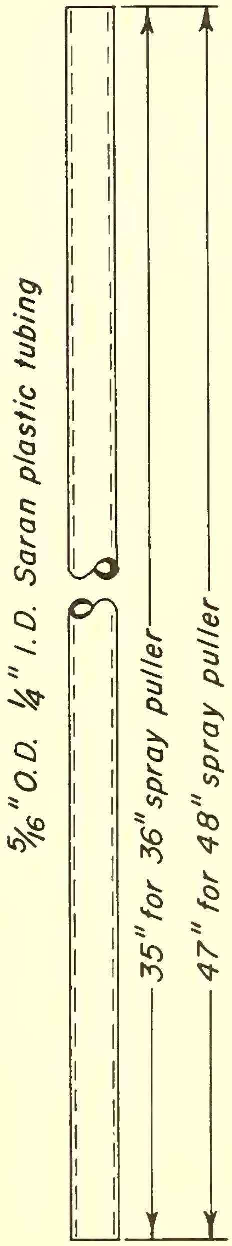
3/4"
1/2"
6"
30 mm. 4 mm. pitch knuckle thread, six threads per inch, 1.157" major dia., 1.066" root dia.
1/16" wall
3" O.D.

PULLER HOUSING
AND COLLAR

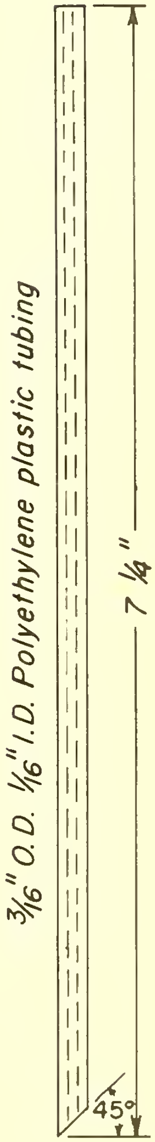
ALUMINUM TUBING



CONNECTOR
TUBE



LIQUID
TUBE



* NATIONAL AGRICULTURAL LIBRARY
1022590070